



Contaminants in Wildlife

Alaska Region



Did you know?

- In interior and Arctic Alaska, mercury levels in some peregrine falcon eggs may be elevated enough to impair reproduction.
- In Alaskan polar bears, average levels of the pesticide hexachlorocyclohexane are among the highest reported in the Arctic.
- In southcentral Alaska, over 600 sightings of black-capped chickadees with deformed bills have been reported since 1998.

Contaminants in Alaska

Hazardous chemicals including some pesticides (e.g., DDT, chlordane and toxaphene), industrial chemicals and by-products (including PCBs and dioxins), and toxic elements, such as mercury, are transported to Alaska from remote sources via atmospheric and ocean currents. Alaska also has hundreds of localized pollutant sources, including abandoned military installations, mining sites, landfills, wastewater discharges and frequent marine oil/fuel spills.

Many environmental contaminants are known to alter reproductive system function in adult animals and to affect early life stages of fish, mammals and birds.

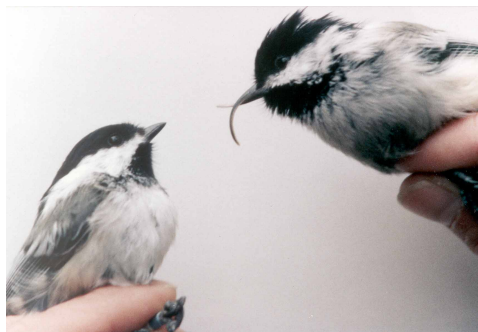
As the primary federal agency dedicated to protecting wildlife and their habitats from pollution's harmful effects, the U.S. Fish and Wildlife Service conducts contaminant studies on important wildlife species, such as migratory birds, anadromous fish and threatened and endangered species. Some recent contaminant studies are summarized in this fact sheet.

Black-Capped Chickadees (*Poecile atricapillus*)

Over 600 sightings of black-capped chickadees with grossly deformed bills have been reported in southcentral Alaska since 1998. More than 90 affected individuals from 19 other species have also been observed.

The causes of these bill deformities are difficult to determine, but they may be influenced by disease, parasites, genetic abnormalities, nutritional deficiencies and other factors. Bill deformities have also been associated with exposure to selenium and PCBs.

The Service and the U.S. Geological Survey (Alaska Biological Science Center) are attempting to determine the frequency and cause of these deformities. Preliminary examination of the data has not yielded an obvious causative agent, but several possibilities are being evaluated. This study continues through 2003.



Black-capped chickadee with normal bill (left) and deformed bill (right). Alaska Biological Science Center

Peregrine Falcons (*Falco peregrinus*)

Peregrine falcon populations declined dramatically following World War II as a result of egg shelling thinning caused by organochlorine pesticides, particularly DDT.

Contaminant residues from peregrine falcon eggs in interior and Arctic Alaska from 1979 to 1995 were recently summarized in a Service technical report. In general, organochlorine pesticides declined over time, although there was less of a decline for PCBs.

Metals generally declined over time, with the exception of mercury, which may have increased during the study period. Mercury was found at levels known to be harmful to peregrine falcon reproduction, and the percentage of affected birds increased over time. Due to concerns that mercury levels may be increasing, egg and feather samples were collected in 2000. The sources of mercury found in peregrine eggs may be from atmospheric deposition and local sources, such as mining sites.

Polar Bears (*Ursus maritimus*)

The Service's Marine Mammals Management Office began an investigation of contaminant levels in polar bears from two Alaskan population stocks (Beaufort Sea and Bering/Chukchi Sea) in 1995.

Levels of PCBs in adult male polar bears from Alaska were relatively low compared to levels found in polar bears in eastern Canada and Norway. However, in Alaskan polar bears average levels of the pesticide hexachlorocyclohexane (HCH) were among the highest reported in the Arctic. Little is known about the potential impacts these relatively high HCH levels may have on health of polar bears, human consumers,

and the Arctic ecosystem. This study will continue through 2002.

Wood Frogs (*Rana sylvatica*)

Wood frogs were surveyed on the Kenai National Wildlife Refuge as part of a national investigation of amphibians on 43 Refuges in 2000. Surprisingly, 24 out of 347 inspected frogs (6.9%) found on the Kenai Refuge had deformities.



Adult wood frog from Kenai National Wildlife Refuge with a deformed limb. USFWS

This was the highest deformity rate observed among the refuges sampled. All deformed individuals were retained and have been sent to the U.S. Geological Survey's National Wildlife Health Center in Madison, WI for further analysis. Additional wood frog sampling will occur in Alaska in 2001.

Sea Otters (*Enhydra lutris*)

Sea otter populations are believed to be growing or stable in most areas of southeast and southcentral Alaska. However, sea otter numbers in the Aleutian Islands have undergone a precipitous decline in the past decade, resulting in recent listing of the Aleutian otters as a Candidate Species under the Endangered Species Act.

Previous contaminant sampling in Alaska documented elevated organochlorines, mainly PCBs, in sea otter livers from several sites in the Aleutian Island chain. In contrast, sea otter tissues were relatively free of contaminants in two areas

sampled in southeast Alaska. Recent Service sampling of sea otters throughout the state identified several otters with low organochlorine levels. Currently, the impacts of these contaminants on sea otters is unknown.

Steller's Eiders (*Polysticta stelleri*)

Lead exposure in threatened Steller's eiders breeding near Barrow, AK is being investigated by the Service. Initial sampling found clinically significant levels of lead in blood collected from nesting females of this threatened species, suggesting that lead exposure in this area may be affecting breeding Steller's eiders. Lead exposure can cause various chronic health effects and can be lethal.

Spectacled Eiders (*Somateria fischeri*)

Exposure of threatened spectacled eiders to environmental contaminants may be contributing to the decline of this species. Past studies on the Yukon-Kuskokwim Delta breeding grounds found high blood lead levels in some spectacled eiders and documented mortality caused by ingestion of spent lead shot from local wetlands.

The Service conducted a contaminants survey of migrating male spectacled eiders in 1995 on St. Lawrence Island. Concentrations of organic chemicals such as DDT and PCBs were very low. However, copper, cadmium and selenium concentrations were high relative to other marine birds. The potential effects of these contaminants on spectacled eiders is unknown.

Burbot (*Lota lota*)

Burbot are an important subsistence fish species in Alaska. Burbot liver samples were collected for organochlorine analysis from three National Wildlife Refuges in interior Alaska and the Tanana River near Fairbanks. In general, there were greater contaminant concentrations from samples collected downstream from Fairbanks and samples collected within the Yukon Flats Refuge than at Tetlin and Kanuti Refuges. Concentrations of DDT and its metabolites were higher at Fairbanks, probably reflecting historical pesticide use within the city of Fairbanks and at nearby

military bases. The results from this study are preliminary, and further studies would illuminate whether the concentrations found at Fairbanks and Yukon Flats are of concern to fish and wildlife resources.

Red-Throated Loons (*Gavia stellata*)

The number of red-throated loons breeding in Alaska declined 53% from 1977 to 1993. In 1998, the Service identified red-throated loons as a "species at risk" in Alaska. The Service and the Alaska Biological Science Center are conducting an investigation of declining red-throated loon populations in western Alaska and in the Copper River Delta. Initial sampling found relatively high levels of organochlorine compounds in some red-throated loon eggs. This work will continue during 2001.



Red-throated loon USFWS

Future Issues

Some of the ongoing contaminant studies being conducted in Alaska are summarized in this fact sheet. Alaska faces an array of unique contaminant issues, and it is the responsibility of the Service to protect America's fish and wildlife and their habitats from pollution's harmful effects. To achieve this goal, further contaminant studies in Alaska are needed. Data gaps include contaminant effects on declining species, monitoring of contaminant trends in key indicator species, investigating new chemicals of concern and evaluating subtle biological effects (e.g., endocrine disruption). Additionally, effects of global climate change due to greenhouse gases are being observed first in the Arctic. Monitoring the effects of climate change on natural resources is a daunting task and will require the participation of many Service programs.

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